

THAT WHICH IS CLAIMED:

1. A method of injecting and combusting combustion fluids in a  
5 combustion chamber, comprising:  
injecting at least one stream of oxidizing fluid into the combustion  
chamber, the oxidizing fluid comprising oxygen and substantially free of  
nitrogen and sulfur;  
alternatingly injecting a first combustion fuel through a first plurality  
10 of fuel jets into the combustion chamber and a second combustion fuel  
through a second plurality of fuel jets into the combustion chamber, such that  
the first and second combustion fuels impinge on the stream of oxidizing fluid  
in the combustion chamber; and  
combusting the combustion fuel with the oxidizing fluid.  
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2. A method according to Claim 1 wherein injecting a first combustion  
fuel comprises injecting the first combustion fuel from the first fuel jets  
located at a first plurality of locations about each stream of oxidizing fluid  
such that the first combustion fuel from the first plurality of locations  
20 impinges on the respective stream of oxidizing fluid and wherein injecting a  
second combustion fuel comprises injecting the second combustion fuel from  
the second fuel jets located at a second plurality of locations about each stream  
of oxidizing fluid such that the second combustion fuel from the second  
plurality of locations impinges on the respective stream of oxidizing fluid.  
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3. A method according to Claim 1 further comprising injecting a recycle  
gas comprising steam and carbon dioxide into the combustion chamber  
through a first annular space at an inside perimeter of the combustion  
chamber.  
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4. A method according to Claim 1 wherein injecting a first combustion  
fuel comprises injecting a synthesis gas of hydrogen and carbon monoxide and  
wherein injecting a second combustion fuel comprises injecting methane.

5. A method according to Claim 1 wherein injecting a first combustion fuel and injecting a second combustion fuel comprise injecting the first and second combustion fuels at dissimilar mass rates.
- 5 6. A method according to Claim 1 wherein injecting the first combustion fuel comprises injecting the first combustion fuel through a manifold comprising an annular space that extends circumferentially around at least one of the main jets.
- 10 7. A method according to Claim 1 wherein injecting a first combustion fuel comprises injecting the first combustion fuel into the combustion chamber at a converging angle of between about 10° and 45° relative to the central axis of one of the at least one streams of oxidizing fluid such that the first combustion fuel impinges on the respective stream of oxidizing fluid in the
- 15 combustion chamber and wherein injecting a second combustion fuel comprises injecting the second combustion fuel into the combustion chamber at a converging angle of between about 10° and 45° relative to the central axis of one of the at least one streams of oxidizing fluid such that the second combustion fuel impinges on the respective stream of oxidizing fluid in the
- 20 combustion chamber.
8. A method according to Claim 1 further comprising circulating a coolant fluid through at least one coolant chamber in an injector body.
- 25 9. A method according to Claim 1 wherein injecting at least one stream of oxidizing fluid comprises injecting a plurality of streams of oxidizing fluid, each stream having a center located at least about 4 inches from the centers of the other streams.
- 30 10. A method according to Claim 1 wherein injecting at least one stream of oxidizing fluid comprises injecting a stream of oxidizing fluid with a diameter of at least about 1 inch.

11. A method according to Claim 1 wherein injecting a recycle gas comprises injecting steam and carbon dioxide into the combustion chamber to limit the combustion temperature to about 4000° F.